

## WHAT IS CLAIMED IS:

1. A fuel filling apparatus, comprising:

an overfilling protective valve, arranged in a fuel gas supply path for supplying a fuel gas to an automobile, the overfilling protective valve further comprising:

5 a fuel gas path;

a valve unit, for opening and closing the fuel gas path by a valve body;

a valve body displacement means, for displacing the valve body according to a filling pressure of the fuel gas; and

10 a temperature modulating unit, for modulating a temperature of the valve body displacement means.

2. The fuel filling apparatus of claim 1, further comprising a heat exchanger arranged in the fuel gas supply path for cooling the fuel gas.

3. The fuel filling apparatus of claim 2, wherein the temperature modulating unit uses a refrigerant supplied to the heat exchanger to cool the valve body displacement means.

4. A fuel filling apparatus, for filling a hydrogen gas into a fuel tank of an automobile that uses the hydrogen gas as a fuel, the fuel filling apparatus comprising a heat exchanger for cooling the hydrogen gas.

5. A fuel filling apparatus, for filling a hydrogen gas into a fuel tank of an automobile that uses the hydrogen gas as a fuel, the fuel filling apparatus comprising:

20 a heat exchanger, using a liquid inert gas as a refrigerant to cool the hydrogen gas, wherein the heat exchanger performs a heat exchange with the hydrogen gas to gasify the liquid inert gas to obtain an inert gas, and the obtained inert gas is discharged into the fuel filling apparatus.

6. The fuel filling apparatus of claim 5, wherein the heat exchanger further comprises a first heat exchange unit for cooling the hydrogen gas by an intermediate medium, and a second heat exchange unit for cooling the intermediate medium by the liquid inert gas.

5        7. A fuel filling apparatus, for filling a hydrogen gas into a fuel tank of an automobile that uses the hydrogen gas as a fuel, the fuel filling apparatus comprising:

        a flow modulating valve, for modulating a supply amount of a hydrogen gas; and

        a cooling means, for cooling the hydrogen gas passing through the flow modulating valve.

10        8. The fuel filling apparatus of claim 8, further comprising a control means for controlling the supply amount of the hydrogen gas, and the control means further comprising a memory unit for storing a temperature history data base; and a control unit for controlling the supply amount of the hydrogen gas by modulating an aperture of the flow modulating valve according to data stored in the temperature history data base, and

15        wherein the temperature history data base comprises data showing a relationship among a temperature in the fuel tank before filling, a temperature of the hydrogen gas fill to the fuel tank, the aperture of the flow modulating valve, and a temperature in the fuel tank when filling the hydrogen gas.

20        9. A fuel filling method, for filling a hydrogen gas into a fuel tank of an automobile that uses the hydrogen gas as a fuel by using an fuel filling apparatus, wherein the fuel filling apparatus comprises a flow modulating valve for modulating a supply amount of the hydrogen gas and a cooling means for cooling the hydrogen gas, and the fuel filling method comprising:

        cooling the hydrogen gas passing through the flow modulating valve by using the

cooling means; and

filling the cooled hydrogen gas into the fuel tank.

10. The fuel filling method of claim 11, wherein fuel filling apparatus further comprises a control means for controlling the supply amount of the hydrogen gas, and the  
5 control means further comprises a memory unit for storing a temperature history data base; and a control unit for controlling the supply amount of the hydrogen gas by modulating an aperture of the flow modulating valve according to data stored in the temperature history data base, and

10 wherein the temperature history data base comprises data showing a relationship among a temperature in the fuel tank before filling, a temperature of the hydrogen gas fill to the fuel tank, the aperture of the flow modulating valve, and a temperature in the fuel tank when filling the hydrogen gas.